

## WHAT IS CLAIMED IS:

1. An apparatus for detecting currents in a three-phase power transmission system, said apparatus comprising:

    a first detection circuit electrically coupled to a first phase of said three-phase transmission system;

    a second detection circuit electrically coupled to a second phase of said three-phase transmission system different than said first phase; and

    an event output switch electrically coupled to said first detection circuit and said second detection circuit, said event output switch configured to actuate when a subsynchronous current on at least one of said first phase and said second phase exceeds a pre-selected subsynchronous current setpoint.

2. An apparatus in accordance with Claim 1 wherein at least one of the first detection circuit and the second detection is electrically coupled to a series capacitor bank.

3. An apparatus in accordance with Claim 1 wherein said event output switch is configured to actuate in less than approximately one second when a subsynchronous current is detected.

4. An apparatus in accordance with Claim 1 wherein said pre-selected subsynchronous current setpoint is between approximately 17% and approximately 67% of a nominal line frequency.

5. An apparatus in accordance with Claim 1 wherein said first detection circuit comprises an alternating current analog output and a direct current analog output and said second detection circuit comprises an alternating current analog output and a direct current analog output.

6. An apparatus in accordance with Claim 1 wherein said first detection circuit and said second detection circuit are operable using at least one of a current input and a voltage input.

7. An apparatus in accordance with Claim 6 wherein said first detection circuit and said second detection circuit comprise a jumper switch configured to select at least one of said current input and said voltage input.

8. An apparatus in accordance with Claim 1 wherein said apparatus is operable using at least one of a plurality of line frequencies, a subsynchronous passband, a passband gain, and a variable current range.

9. A series capacitor bank for a three-phase power transmission system, said capacitor bank comprising:

a first detection circuit electrically coupled to a first phase of said three-phase transmission system;

a second detection circuit electrically coupled to second phase of said three-phase transmission system different than said first phase; and

an event output switch electrically coupled to said first detection circuit and said second detection circuit, said event output switch configured to actuate when a subsynchronous current on at least one of said first phase and said second phase exceeds a pre-selected subsynchronous current setpoint.

10. A series capacitor bank in accordance with Claim 9 wherein said event output switch is configured to actuate in less than approximately one second when a subsynchronous current is detected.

11. A series capacitor bank in accordance with Claim 9 wherein said pre-selected subsynchronous current setpoint is between approximately 15% and approximately 65% of a nominal line frequency.

12. A series capacitor bank in accordance with Claim 9 wherein said first detection circuit comprises an alternating current analog output and a direct current analog output and said second detection circuit comprises an alternating current analog output and a direct current analog output.

13. A series capacitor bank in accordance with Claim 9 wherein said first detection circuit and said second detection circuit are operable using at least one of a current input and a voltage input.

14. An apparatus in accordance with Claim 13 said first detection circuit and said second detection circuit comprise a jumper switch configured to select at least one of said current input and said voltage input.

15. A three-phase power transmission system, said transmission system comprising:

a series capacitor bank;

a first detection circuit electrically coupled to a first phase of said three-phase transmission system;

a second detection circuit electrically coupled to second phase of said three-phase transmission system different than said first phase; and

an event output switch electrically coupled to said first detection circuit and said second detection circuit, said event output switch configured to actuate when a subsynchronous current on at least one of said first phase and said second phase exceeds a pre-selected subsynchronous current setpoint at said series capacitor bank.

16. A power transmission system in accordance with Claim 15 wherein said event output switch is configured to actuate in less than approximately one second when a subsynchronous current is detected.

17. A power transmission system in accordance with Claim 15 wherein said pre-selected subsynchronous current setpoint is between approximately 17% and approximately 67% of a nominal line frequency.

18. A power transmission system in accordance with Claim 15 wherein said first detection circuit comprises an alternating current analog output and a direct current analog output and said second detection circuit comprises an alternating current analog output and a direct current analog output.

19. A power transmission system in accordance with Claim 15 wherein said first detection circuit and said second detection circuit are operable using at least one of a current input and a voltage input.

20. A power transmission system in accordance with Claim 19 wherein said first detection circuit and said second detection circuit comprise a jumper switch configured to select at least one of said current input and said voltage input.

21. A method for detecting subsynchronous currents in a power transmission system, said method comprising:

installing at least one detection circuit proximate at least one generator;

coupling the detection circuit to a phase of a three-phase transmission system;

monitoring the phase for a subsynchronous current; and

activating an event output switch when the subsynchronous current exceeds a pre-selected subsynchronous current setpoint.

22. A method in accordance with Claim 21 wherein coupling the detection circuit to a phase of a three-phase transmission system comprises coupling the detection circuit to a phase of a three-phase transmission system including a plurality of generators and a plurality of capacitor banks.

23. A method in accordance with Claim 21 wherein installing at least one detection circuit proximate at least one generator comprises installing at least one detection circuit including a first detection circuit electrically coupled to a first phase of the three-phase transmission system, and a second detection circuit electrically coupled to a second phase of the three-phase transmission system different than said first phase.